IN RE CARL D. CLAY

91-1402
United States Court Of Appeals For The Federal Circuit
966 F.2d 656, 23 U.S.P.Q.2D (BNA) 1058, 1992 U.S. App. Decision
June 10, 1992, Decided

Appealed from: U.S. Patent and Trademark Office Board of Patent Appeals and Interferences

Jack E. Ebel, Marathon Oil Company, of Littleton, Colorado, argued for appellant. With him on the brief was Paul T. Meiklejohn, Seed & Berry, of Seattle, Washington, of counsel. Teddy S. Gron, Associate Solicitor, Office of The Solicitor, of Arlington, Virginia, argued for appellee. With him on the brief was Fred E. McKelvey, Solicitor. Of counsel was Richard E. Schafer.

Before PLAGER, LOURIE, and CLEVENGER, Circuit Judges.

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LOURIE, Circuit Judge.

Carl D. Clay appeals the decision of the United States Patent and Trademark Office, Board of Patent Appeals and Interferences, Appeal No. 90-2262, affirming the rejection of claims 1-11 and 13 as being unpatentable under 35 U.S.C. § 103. These are all the remaining claims in application Serial No. 245,083, filed April 28, 1987, entitled "Storage of a Refined Liquid Hydrocarbon Product." We reverse.

BACKGROUND

Clay's invention, assigned to Marathon Oil Company, is a process for storing refined liquid hydrocarbon product in a storage tank having a dead volume between the tank bottom and its outlet port. The process involves preparing a gelation solution which gels after it is placed in the tank's dead volume; the gel can easily be removed by adding to the tank a gel-degrading agent such as hydrogen peroxide. Claims 1, 8, and 11 are illustrative of the claims on appeal:

1. A process for storing a refined liquid hydrocarbon product in a storage tank having a dead volume between the bottom of said tank and an outlet port in said tank, said process comprising:

preparing a gelation solution comprising an aqueous liquid solvent, an acrylamide polymer and a crosslinking agent containing a polyvalent metal cation selected from the group consisting of aluminum, chromium and mixtures thereof, said gelation solution capable of forming a rigid crosslinked polymer gel which is *[F.2d 658]* substantially insoluble and inert in said refined liquid hydrocarbon product;

placing said solution in said dead volume;

gelling said solution substantially to completion in said dead volume to produce said rigid gel which substantially fills said dead volume; and

storing said refined liquid hydrocarbon product in said storage tank in contact with said gel without substantially contaminating said product with said gel and without substantially degrading said gel.

8. The process of claim 1 further comprising removing said rigid gel from said dead volume by contacting said gel with a chemical agent which substantially degrades said gel to a flowing solution.

11. The process of claim 1 wherein said gelation solution further comprises an aqueous liquid contaminant present in said dead volume which dissolves in said solution when said solution is placed in said dead volume.

Two prior art references were applied against the claims on appeal. They were U.S. Patent 4,664,294 (Hetherington), which discloses an apparatus for displacing dead space liquid using impervious bladders, or large bags, formed with flexible membranes; and U.S. Patent 4,683,949 (Sydansk), also assigned to Clay's assignee, Marathon Oil Company, which discloses a process for reducing the permeability of hydrocarbon-bearing formations and thus improving oil production, using a gel similar to that in Clay's invention.

The Board agreed with the examiner that, although neither reference alone describes Clay's invention, Hetherington and Sydansk combined support a conclusion of obviousness. It held that one skilled in the art would glean from Hetherington that Clay's invention "was appreciated in the prior art and solutions to that problem generally involved filling the dead space with **something.**" Opinion at 3 (emphasis in original).

The Board also held that Sydansk would have provided one skilled in the art with information that a gelation system would have been impervious to hydrocarbons once the system gelled. The Board combined the references, finding that the "cavities" filled by Sydansk are sufficiently similar to the "volume or void space" being filled by Hetherington for one of ordinary skill to have recognized the applicability of the gel to Hetherington.

DISCUSSION

The issue presented in this appeal is whether the Board's conclusion was correct that Clay's invention would have been obvious from the combined teachings of Hetherington and Sydansk. Although this conclusion is one of law, such determinations are made against a background of several factual inquiries, one of which is the scope and content of the prior art. **Graham v. John Deere Co.**, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966).

A prerequisite to making this finding is determining what is "prior art," in order to consider whether "the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art." 35 U.S.C. § 103. Although § 103 does not, by its terms, define the "art to which [the] subject matter [sought to be patented] pertains," this determination is frequently couched in terms of whether the art is analogous or not, **i.e.**, whether the art is "too remote to be treated as prior art." **In re Sovish,** 769 F.2d 738, 741, 226 USPQ 771, 773 (Fed. Cir. 1985).

Clay argues that the claims at issue were improperly rejected over Hetherington and Sydansk, because Sydansk is nonanalogous art. Whether a reference in the prior art is "analogous" is a fact question. **Panduit Corp. v. Dennison Mfg.,** 810 F.2d 1561, 1568 n.9, 1 USPQ2d 1593, 1597 n.9 (Fed. Cir.), **cert. denied,** 481 U.S. 1052 (1987). Thus, we review the Board's decision on this point under the clearly erroneous standard.

Two criteria have evolved for determining whether prior art is analogous: (1) *[F.2d 659]* whether the art is from the same field of endeavor, regardless of the problem addressed, and (2) if the reference is not within the field of the inventor's endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved. **In re Deminski,** 796 F.2d 436, 442, 230 USPQ 313, 315 (Fed. Cir. 1986); **In re Wood,** 599 F.2d 1032, 1036, 202 USPQ 171, 174 (CCPA 1979).

The Board found Sydansk to be within the field of Clay's endeavor because, as the Examiner stated, "one of ordinary skill in the art would certainly glean from [Sydansk] that the rigid gel as taught therein would have a number of applications within the manipulation of the storage and processing of hydrocarbon liquids . . . [and that] the gel as taught in Sydansk would be expected to function in a similar manner as the bladders in the Hetherington patent." These findings are clearly erroneous.

The PTO argues that Sydansk and Clay's inventions are part of a common endeavor -- "maximizing withdrawal of petroleum stored in petroleum reservoirs." However, Sydansk cannot be considered to be within Clay's field of endeavor merely because both relate to the petroleum industry. Sydansk teaches the use of a gel in unconfined and irregular volumes within generally underground natural oil- bearing formations to channel flow in a desired direction; Clay teaches the introduction of gel to the confined dead volume of a man-made storage tank. The Sydansk process operates in extreme conditions, with petroleum formation temperatures as high as 115degreeC and at significant well bore pressures; Clay's process apparently operates at ambient temperature and atmospheric pressure. Clay's field of endeavor is the **storage** of refined liquid hydrocarbons. The field of endeavor of Sydansk's invention, on the other hand, is the **extraction** of crude petroleum. The Board clearly erred in considering Sydansk to be within the same field of endeavor as Clay's.

Even though the art disclosed in Sydansk is not within Clay's field of endeavor, the reference may still properly be combined with Hetherington if it is reasonably pertinent to the problem Clay attempts to solve. **In re Wood,** 599 F.2d at 1036, 202 USPQ at 174. A reference is reasonably pertinent if, even though it may be in a different field from that of the inventor's endeavor, it is one which, because of the matter with which it deals, logically would have commended itself to an inventor's attention in considering his problem. Thus, the purposes of both the invention and the prior art are important in determining whether the reference is reasonably pertinent to the problem the invention attempts to solve. If a reference disclosure has the same purpose as the claimed invention, the reference relates to the same problem, and that fact supports use of that reference in an obviousness rejection. An inventor may well have been motivated to consider the reference when making his invention. If it is directed to a different purpose, the inventor would accordingly have had less motivation or occasion to consider it.

Sydansk's gel treatment of underground formations functions to fill anomalies[1] so as to improve flow profiles and sweep efficiencies of injection and production fluids through a formation, while Clay's gel functions to displace liquid product from the dead volume of a storage tank. Sydansk is concerned with plugging formation anomalies so that fluid is subsequently diverted by the gel into the formation matrix, thereby forcing bypassed oil contained in the matrix toward a production well. Sydansk is faced with the problem of recovering oil from rock, **i.e.**, from a matrix which is porous, permeable sedimentary rock of a subterranean formation where water has channeled through formation anomalies and bypassed oil present in the matrix. Such a problem is not reasonably pertinent to the particular problem with which Clay was involved -- preventing loss of stored *[F.2d 660]* product to tank dead volume while preventing

contamination of such product. Moreover, the subterranean formation of Sydansk is not structurally similar to, does not operate under the same temperature and pressure as, and does not function like Clay's storage tanks. **See In re Ellis,** 476 F.2d 1370, 1372, 177 USPQ 526, 527 (CCPA 1973) ("the similarities and differences in structure and function of the invention disclosed in the references . . . carry far greater weight [in determining analogy]").

A person having ordinary skill in the art would not reasonably have expected to solve the problem of dead volume in tanks for storing refined petroleum by considering a reference dealing with plugging underground formation anomalies. The Board's finding to the contrary is clearly erroneous. Since Sydansk is non-analogous art, the rejection over Hetherington in view of Sydansk cannot be sustained.

CONCLUSION

For the foregoing reasons, the decision of the Board is **REVERSED.**

1 Sydansk refers to an anomaly, one of two general region types in an oil-bearing geological formation, as "a volume or void space [**e.g.,** 'streaks, fractures, fracture networks, vugs, solution channels, caverns, washouts, cavities, etc.'] in the formation having very high permeability relative to the matrix [the other region type, consisting of homogeneous porous rock]."